REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 1-5, 13 and 14 remain in the application and are all directed to elected subject matter.

With regard to the requirement for restriction and set out in items 1-6 of the Official Action, counsel affirms the election of the claims of Group I, namely claims 1-5, 13 and 14. This response is made and was made in the telephone discussions with the examiner with traverse to the extent that non-elected process claims 6-12 may be rejoined once the product claims are allowed.

Instructions are given above to delete claims 6-12 again with the caveat that such claims may be rejoined once product claims are allowed.

The claims have been amended in order to more particularly point out and distinctly claim that which applicants regard as their invention. Claim 13 is amended to depend from any one of elected claims 1-5.

Claim 1 has been amended for purposes of clarity and to respond to the rejection stated in items 9 and 10 of the Official Action. More specifically, the amount of the oil adhering to the fibers decreases to the indicated range after heat treatment. In addition, the characteristics of the oil from original claim 2 have now been inserted into claim 1. The significance of these changes is discussed in more detail below.

Items 11-13 of the Official Action set out two prior art-based rejections featuring U.S. patent 6,235,663 to Dahringer as the applied reference. Before discussing and addressing each of these rejections it is important to review applicants' contribution to the art as characterized in the claims now under consideration.

Amended claim 1 specifies that the oil adhering to the polyethylene heat-bonding fiber contains, as a main component, an ester obtained from polyethylene glycol having a molecular weight of 400 to 800 and a fatty acid having 10 to 20 carbon atoms. The polyethylene glycol fatty acid ester having this molecular weight used in the present

invention does not lose its weight by volatilization or thermal decomposition when the staple fiber to which the polyethylene glycol fatty acid ester adhered is heated.

As described in the specification, page 5, lines 17 to 21, when the staple fiber of the present invention is heat-treated, hydrophilic groups of the polyethylene glycol fatty acid ester infiltrate the fiber, and the hydrophobic groups are actually present on the fiber surface, and the oil remains even after the staple fiber is formed into a non-woven fabric, so that the staple fiber exhibits the static charge of the oil for a long period of time.

Independent claim 1 also specifies that the amount of the adhering oil is decreased from 0.05 – 1.0 % by weight to 0.001 to 0.2 % by weight by heat treatment, and that the decrease ratio of the amount of the adhering oil is at least 60 %. This requirement shows that a major portion of the oil infiltrates the fiber without being evaporated or thermally decomposed by heat treatment, and the amount of the oil adhering to and existing in the surface of the fiber decreases.

The above point is further illustrated by the following: In the present invention, as described in the specification, page 8, lines 9 to 11, the heat treatment is carried out at a hot-air temperature of 102°C to 145°C, and at this temperature range, the specified polyethylene glycol fatty acid ester is neither evaporated nor thermally decomposed. Further, as described in the specification, page 5, line 25 to page 6, line 3, measurement of the amount of adhering oil before and after the heat treatment is carried out by subjecting heat treated heat-bonded fiber or non-woven fabric to an extraction treatment in an ethanol/methanol mixture solvent and extracting the adhering oil.

For purposes of illustration and further explanation, please see the attached Fig. 1 showing that the polyethylene glycol fatty acid ester used in the present invention is neither evaporated nor thermally decomposed at the heat-treatment temperature (102 to 145°C) employed in this invention.

Fig. 1 is a graph showing the relationship between the time period for heat treatment (125°C) of a polyethylene glycol-oleic acid monoester (molecular weight 600) used as a polyethylene glycol fatty acid ester in Example 1 and the change in residual

ratio of the polyethylene glycol-oleic acid monoester. The graph shows that when the polyethylene glycol-oleic acid monoester is maintained at 125°C for 2 hours, there is almost no change in weight.

Applicants will submit this data in the form of a declaration if the examiner so requests.

Turning now to the applied reference, Dahringer US'663 discloses a fiber and non-woven fabric similar to those in the present invention. As clearly stated in the abstract, however, the oil used by Dahringer is an amine oxide compound of the following formula (I),

$$R_1R_2R_3NO$$

and this amine oxide compound is completely structurally different from the polyethylene glycol fatty acid ester used in the present invention.

As described by Dahringer in column 3, lines 50 to 55, further, the amine oxide compound of the formula (I) used as the oil is volatilized or thermally decomposed by heat treatment. "The [oil] which should be volatized, especially compounds of formula (I), decompose at relatively low temperatures." Thus, Dahringer's amine oxide compounds are completely different from the polyethylene glycol fatty acid esters used in the present invention in that the polyethylene glycol fatty acid esters infiltrate the fiber under heat treatment and show a decrease in the amount of the same adhering to the surface of the fiber.

In the Official Action the examiner draws attention to two passages in Dahringer relating to the amount of the oil (column 3, lines 5 – 11), a remaining amount thereof (column 3, lines 50 – 55), and the like. Applicants are aware of these amounts however, it must be understood in the overall context of the applied reference as these values are given with regard to the particular amine oxides of the formula (I) and are not those given with regard to a particular polyethylene glycol fatty acid ester.

Dahringer at column 8, describes Examples 1d and 1e for comparisons. These Examples use, as the oil, fatty acid polyethylene glycol esters together with phosphoric acid esters and fatty acid polyethylene glycol ethers.

The mat sample C of Example 2 is a product obtained by heat-treating a mat obtained from 80 % of a fiber (VKEL) obtained in Example 1d and 20 % of a fiber (VKBI) obtained in Example 1e, at 200°C (both comparative examples). However, the decrease ratio of the adhering oil is calculated to be only 11.3 %. The calculation based on the data contained in the Dahringer patent is as follows:

(i) The amount (X) of adhering oil on fiber (VKEL) in Example 1d = 0.12 wt%

(ii) The amount (Y) of adhering oil on fiber (VKBI) in Example 1e = 0.14 wt%

(iii) The amount (Z) of adhering oil on mat C after heat treatment = 0.11 %

(see Table on middle portion of column 8)

The decrease ratio (%) of adhering oil

$$= \frac{(X \times 0.8 + Y \times 0.2) - Z}{X \times 0.8 + Y \times 0.2} \times 100$$

$$= \frac{(0.12 \times 0.8 + 0.14 \times 0.2) - 0.11}{0.12 \times 0.8 + 0.14 \times 0.12} \times 100$$

$$= 11.3\ \%$$

The above value of 11.3 % as a decrease ratio of the amount of the adhering oil is significantly smaller than "at least 60 %" specified in applicants' description and required by applicants' claims.

Based upon applicants' understand of the Dahringer disclosure and based on the above calculations, the reason why the decrease ratio of the amount of the adhering oil in mat C described in Dahringer US'663 is extremely low is presumably that the oil

additionally contains phosphoric acid esters and fatty acid polyethylene glycol ethers, and that the molecular weight of the polyethylene glycol fatty acid ester and the number of carbon atoms of alkyl group of the fatty acid differ from those of the polyethylene glycol fatty acid used in the present invention.

In the outstanding Office Action, page 5, lines 7 – 8, the examiner points out that suitable fatty acids include those derived from stearyl, oleyl and lauryl (column 3, 30 – 35). While this is true, it must be taken in context of the overall disclosure, because the passage at column 3, lines 30 – 35 describes examples of group R_1 with regard to the amine oxide represented by the formula (I),

$$R_1R_2R_3NO.$$

This passage does not show any alkyl group of the fatty acid in the polyethylene glycol fatty acid ester.

The examiner argues that original claims 1 – 4, 13 and 14 lack novelty and unobviousness over Dahringer US'663. However, Dahringer US'663 neither discloses nor suggests any of the features of the above amended claim 1, so that amended claim 1 and the claims dependent thereon are patentable over Dahringer US'663.

The rejection set out in item 13 of the Official Action only applies the Dahringer et al reference as discussed above to claim 5. However, in the text discussing the rejection mention is made of "Pike et al" which counsels understands to be US 5,855,784. Thus it is counsel's understanding that the rejection is based upon the combination of these two documents even though Pike et al is not expressly applied.

The examiner rejects claim 5, that is dependent upon claim 1, and which specifies a "sheath-core composite fiber" by relying on two references. Applicants do not contend whether or not the sheath-core composite fiber was known. Since, however, the amended claim 1 is patentable, claim 5 is similarly patentable by virtue of its dependency.

For the above reasons it is respectfully submitted that the claims of this application define inventive subject matter. Reconsideration and allowance are solicited.

Respectfully submitted,

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